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Health-care seeking behaviour among terminally ill adults in Addis Ababa, Ethiopia.

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UNIVERSITY OF THE WITWATERSRAND

FACULITY OF HUMANITIES

Masters Degree Research Report Submitted to the Faculty of Humanities,
in Partial Fulfilment of the Requirements for the MA Degree in
Demography and Population Studies.

Project title:

Health-Care Seeking Behaviour among terminally ill adults in Addis Ababa, Ethiopia.

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Declaration

I, Joan Mary Kahwa, declare that this research report is my own independent work. It is submitted for the partial fulfilment for the degree of Master of Arts in Demography and Population Studies at the University of the Witwatersrand, Faculty of Humanities. It has not been submitted before for any other degree or examination at this or any other university**.**

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ABSTRACT

Using data collected in 2007 for Addis Ababa Mortality Surveillance, the paper examines the effect of cause of death/type of illness on choice of health care in adults 12 years and above. The multinomial logit model using bootstrapped standard errors is used to investigate the relationship between dominant type of treatment and the covariates: cause of death, gender, age, education, occupation, ethnicity and religion. Availability of water, television and telephone in the household are used as a proxy for economic status. After controlling for duration of illness (exposure), type of illness, gender and marital status are significant. Those who die of HIV/TB and cancer behave similar in way they seek help, and have high likelihood of using traditional healers as the first point for help compared to those who died as a result of other illnesses. Thus the study concludes that cause of death; gender and marital status affect choice of health service.

Key words: health care utilization, cause of death, HIV/AIDS/TB, traditional healer, medical pluralism, deceased.

1 INTRODUCTION

1.1 Background

A visit to holy water sources is considered to have healing powers and is a relatively common curative option among Ethiopians, especially those of Orthodox faith. The practice involves visiting a source of water considered as 'holy water' for healing and cleansing purposes based on religious belief. Consultation with traditional healers is also common (Kassaye et al. 2006; Pankhurst, 1990), although there is a wide variation in the types of folk or traditional healers found in any society, from purely secular to technical experts like bone setters, midwives, tooth extractors, to spiritual healers, divine healing and herbalists.

Like much of the developing world, medical pluralism, or the existence of several distinct therapeutic systems in a single cultural setting, characterized by a rise in use of alternative health services is increasingly an important feature of the health care and health system in Ethiopia (Gedif and Hahn, 2002). Over the last twenty years, urban centres in Ethiopia have been characterized by an increasing burden of HIV/AIDS and chronic illness. HIV prevalence among adults (15-49) is nationwide estimated at 2.1 %; but the adult HIV prevalence in urban areas is much higher at 7.7% than in rural areas 0.9% (MOH, 2007). Also, data show relatively higher prevalence among females (2.6%) than males (1.7%) (UNAIDS, 2008).

1.2 Statement of the problem

Despite the ongoing evidence that people do choose traditional and folk medicine or providers in a variety of contexts which have potentially profound impacts on health, few studies have investigated the use of alternative health services among those who die of terminal illness. By the same token there is now growing recognition of the need to be more sensitive to the realities of health services used in increasingly medical pluralist societies.

This study seeks to explore health-care seeking behaviour (HCSB) of adults who die of HIV/AIDS and TB as opposed to other causes of death; and establish the first point of contact for health care in adults who die of terminal illness.

1.3 Purpose of the study

The purpose of this study is to establish whether there is a difference among adults in the use of health services by cause of death and determine if the first point of contact for adults who died of HIV/AIDS is hospital or otherwise.

1.4 Objective

To evaluate whether use of health services differ by cause of death.

1.5 Research Question

Is there a difference in use of health services between adults who died of HIV/TB and those who died from other illness?

1.6 Hypothesis

There is a difference in use of health service between those who die of HIV/TB and those who die from other causes.

1.7 Definition of terms

Health-care seeking behaviour referred to choice and use of health services such as hospitals, clinics, health centres, traditional healer, holy water source, and visits to witch doctors.

Terminal illness was defined as any illness that was the cause of death, as the study focused on people who eventually died. This perspective does not make a distinction as to whether the illness is curable or manageable as in strict definition of terminal illness in medical terms.

1.8 Data

The study used data collected by Addis Ababa Mortality Surveillance Project (AAMSP). The data was obtained from interviews with close relatives and/or primary caretakers of the deceased. In these interviews, also referred to as Verbal Autopsies (VAs), the caretakers are asked about the signs and symptoms the deceased suffered from during terminal illness and the type of health care or other remedies used by the deceased. More details on the data collection are provided in the methodology section 3.

1.9 Study limitations

Design limitation

Since this study used Verbal Autopsy (VA) as source of data the available information is only for the deceased which are generally a few, compared to the general population that is alive. This might have resulted in selection bias since those who died might have some characteristics that are different from the general population. For that reason, the results of this study may not be extrapolated to the general population.

Data limitations

The use of cause of death data resulted in few cases with an established cause of death and subsequently a small sample size of 1,066. The use of VA interviews is subject to recall bias and interviewer bias. It is also subject to underreporting of burials of residents who are buried beyond the city administration limits, the return of terminally sick migrants to their families for care (in-migrants moving from the study site), and failure of cemetery clerks to register burials. In this study, we assume that underreporting of burials is not selective and therefore that it should not affect the results.

Although VA methodology is not the focus of the present study, we refer to Chandramohan et al. (1994) to describe and justify its use as well as its limitations: “The use of VA method is often associated with difficulties (in the absence of medical and laboratory data) with coincident syndrome complexes to reach a definitive diagnosis (e.g. discerning malaria and lower respiratory tract infection in children). VA has potential for multiple causes of death to generate inconsistencies and allow selective diagnosis and some causes of death are impossible to determine by VA. Moreover, VA is subject to misclassification error (attributing the wrong cause of death) and several factors can influence the validity and reliability of verbal autopsies, including the tools used (mortality classification, questionnaire and procedure for deriving diagnoses), the process of data collection and challenges around sensitivity and specificity. VAs generally have weak sensitivity in the context of endemic diseases with nonspecific symptoms. VAs are prone to inaccuracies because the diagnoses depend on factors such as ability of respondents to observe, register, recollect, and report the circumstances, symptoms, and signs that lead to the death of an individual; the interviewers’ competence in collecting information; and the ability of physicians or algorithms to determine a diagnosis from the history of an illness prior to a death” (Chandramohan et al., 1994).

Also, the available data does not contain information on the reasons for choosing a specific health service provider. Information on social support systems (whether formal or informal) is not available in the VA data set. For that reason, the effect that social support systems have on the use of health services is beyond the scope of this study.

1.10 Justification of the study

This study was initiated in order to determine health service utilization of adults who die of HIV/TB and other terminal illnesses. Information on health care use has important implications in planning for health service provision. A better understanding of health service use associated with illness would assist through helping direct and improve health service provision and education initiatives for those who are terminally ill; as well as provide useful factual information that can be used to assist those who suffer and eventually die from terminal illness.

2 LITERATURE REVIEW

There is a growing body of literature relating to health services use and that of multiple providers in developing economies including Ethiopia. Factors determining the use of health services are of a socio-demographic nature including education, social structures, cultural beliefs and practices, gender issues, economic and political systems, environmental conditions, types of diseases and the disease pattern, and the health care system itself (Kroeger, 1983; Andersen, 1995; Katung, 2001; Trivedi, 2000; Adamson et al., 2003). In many developing countries health services are often provided through several, sometimes overlapping, channels that include both modern and traditional forms of medicine and healing (Beals, 1976, Feierman, 1981, Kroeger, 1983, Hunte and Sultana, 1992, Develay et al., 1996, Ngalula et al., 2002, Nyamongo, 2002, Hatchett et al., 2004, Case et al., 2005, de-Graft Aikins, 2005). Similarly, several social scientists (Bhardwaj 1980; Fabrega 1980; Foster and Anderson 1978; Frankenberg and Larson 1976; Kleinman 1980; Young 1983) have noted that the medical system in many places, especially in most of the developing countries is pluralistic: that is both Western and non-Western forms of health care are delivered and can be used simultaneously by the population. For most inhabitants of developing countries, however, access to local folk or traditional sources of health care is easier than access to modern health care.

Medical pluralism has been defined in different ways. For example, for some authors it refers first of all to the social organisation of healing practitioners who often occupy different religious, ideological, `ethnic', or class positions in their communities. It also refers to the cultural organisation of their practice; the coexisting and competing discourses of affliction and healing with which they legitimate their therapeutic power. The study of medical pluralism further addresses the way people choose between competing therapies. Anthropologists have classically portrayed these as `health care seeking-behaviours; defining symptoms, seeking out a healer, evaluating treatment (Chrisman 1977, Young 1981). Minocha (1980) proposes that medical pluralism can be understood to mean two things; it may mean the co-existence of multiple systems of medicine which present multiple choices to individuals. It may also mean pluralism within a particular system.

Kleinman (1978, cited in Helman 2001) suggests that, in looking at any complex society, one can identify three overlapping and interconnected sectors of health care; the ‘popular’ sector; the ‘folk’ sector and the ‘professional’ sector. The popular sector includes all the therapeutic options that people utilize, without any payment and without consulting either folk healers or medical

practitioners. Among these options is self-treatment or self-medication, advice or treatment given by a relative, friend, neighbour or workmate, or consultation with another lay person who has special experience of a particular disorder. The folk sector is especially large in non-industrialized societies; certain individuals specialize in forms of healing that are either sacred or secular, or a mixture of the two. These healers are not part of the official modern medical system, and occupy an intermediate position between the popular and professional sectors (*ibid*). The professional modern sector comprises the organized, legally sanctioned healing professions, such as modern Western scientific medicine, also known as allopathy or biomedicine. It includes not only physicians of various types and specialities, but also the recognized paramedical professions such as nurses, midwives and physiotherapists. In most countries a special form of health care alternative or complimentary medicine overlaps both folk and professional sectors (*ibid*).

In most developing countries, folk and traditional forms of health care existed and were commonly used by the people before the introduction of modern medicine (Subedi, 1989). Traditional healing is perhaps the only health system that is accessible to everyone in Africa. More than 80% of people in sub-Saharan Africa still use the services of traditional healers (Green, 1997). Traditional healing has been sustained over the past years partly because it is available, acceptable, and affordable and because it's based on cultural and traditional values (Subedi, 1989). It is now well understood that the sources of prevention and cure of particular problems are determined to a great extent by the patients' sociocultural and religious background (Airhihenbuwa, 1987). These alternative types of health care services are still used widely today despite the introduction of modern medicine.

Likewise, "*folk and traditional health care is both socially and culturally closer to the people, in particular traditional healers are better able to define and treat illness –that is, the social and psychological and moral dimensions associated with illness; whereas modern health care has been criticised for being unacceptable and unsatisfying to the majority of the people*" (Subedi, 1989). Some scholars further argue that most traditional healers share the basic cultural values and world view of the communities in which they live, including beliefs about the origin, significance and treatment of ill health. "*In societies where ill health and other forms of misfortune are blamed on social causes (witch craft, sorcery or evil eye) or on supernatural causes (gods, spirits, ancestral ghosts or fate), sacred folk healers are particularly common*" (Straker, 1994). Their approach is usually a holistic one, dealing with the all aspects of the patient's life, including relationships with other people, with the natural environment and with

supernatural forces, as well as any physical or emotional symptoms (Griffiths & Cheetham, 1982; Straker, 1994; Ngubane, 1977). Western doctors on the other hand are often separated from their patients by social class, economic status, specialized education and cultural background.

In many countries today such folk healers are often used in parallel with modern medical treatment, even though both are based on very different premises. People *utilize both* systems, but for different purposes. As in many other cultures, the doctors tend to tell their patients what has happened, while the healers tell them why. Healers explain ill health in wider, more familiar cultural terms-involving the social, psychological and spiritual aspects of their patients' lives-while the doctors concentrate mainly on physical diseases and the pathogens or behaviours said to cause them (Griffiths and Cheetham, 1982; Gumede, 1991; Helman, 1985; Gumede, 1991). However, not all folk healers come from the same community in which they work or are familiar with its inner social workings. Some of the techniques they use may also be very dangerous to their patients. The use of unsterilized needles by injectionist, for example, may lead to severe skin blisters, as well as to the spread of hepatitis B or AIDS. Despite this view, it should be emphasized that there are examples of successful collaboration between traditional healers and the official medical system, especially in relation to traditional birth attendants, the promotion of oral rehydration therapy and in the treatment of mental illness. It is important therefore to see folk healers in a balanced way, and to avoid both over-idealization and over-criticism of them. On the one hand, one should avoid the Arcadian view: seeing folk healers and the communities among which they work as somewhat natural and holistic, living in peaceful harmony with nature and with one another. On the other the barbaric view: seeing them and their communities as somewhat primitive, degenerate, incompetent and underdeveloped (Griffiths and Cheetham, 1982).

In Addis Ababa, treatment through self-administered medicine (herbal or modern) and the pursuit of other alternative curative options are relatively common, despite the widespread availability of relatively cheap modern medical services (Kloos et al., 1987, Gedif and Hahn, 2002). Traditional healers (*yebahel medhanit awaqi*) are the main providers of alternative, mainly herbal, medical services in addition to treatment with holy water. The history and range of traditional medical practices in Ethiopia are discussed in greater detail elsewhere (Pankhurst, 1990, Kassaye et al., 2006).

Kroeger and Franken (1981), further show that the preference for traditional forms of health services over modern health care is due partly to the lesser "social distance" of the former system. In similar vein, Gesler (1984), states that healing or treatment has two functions: control of sickness and providing meaning to a person's experience of sickness. Modern health care performs only the first function, while traditional health care performs both functions. In other words, "*modern health care can treat a problem effectively, whereas traditional health care not only treats a problem but also offers a satisfying and culturally meaningful interpretation of the illness*" (Subedi, 1989). In this way, sick people frequently utilize several different types of healer and healing at the same time, or in sequence. This may be done on the pragmatic basis that two (or more) heads are better than one. This simultaneous use of multiple forms of therapy is very common in most complex societies, especially in the presence of serious illness. Many people diagnosed as having cancer, for example, tend to change their behaviour and their diets, increase their intake of vitamins, pray more or join self-help group, and consult with alternative or traditional healers in addition to their biomedical treatment.

Therefore, *"people may try specific kinds of health services providers for particular problems, although they may also use several practitioners to treat a single problem*" (Kelner and Wellman, 1997). In this way, interaction between the three sectors occurs as patients move between them. To confirm this view, Steen and Mazonde (1999), found that TB patients in Botswana visited a 'modern' health facility as a first step. However, after initiating modern treatment, they then went on to visit a traditional or faith healer as well. For these patients TB is seen as a 'European disease' that will respond well to Western medicine. On the other hand, a traditional healer is also consulted to explain the 'meaning' of the disease for that particular person; *"there is an increasing tendency to use modern medicine as a 'quick fix' solution, whereas traditional medicine is utilised for providing answers that may be asked about the meaning of the misfortune, and to deal with the 'real' causes of the illness" (*Steen and Mazonde, 1999*)*. Cultural beliefs and practices often lead to self-care, home remedies and consultation with traditional healers especially in rural communities. Moreover, a study conducted in South Africa found that HIV patients on ARV also consulted traditional healers mainly as many patients tend to believe that traditional healers can help address spiritual concerns arising from the illness (Mall, 2005). To confirm this view, another study in Kwazulu-Natal found that major self-reported reasons for consulting the traditional healers included a complex of supernatural problems or psychosocial problems, chronic conditions/illness, generalized pain, HIV and other STIs (Peltzer and Mngqundaniso, 2008).

The view is often that the desired health service utilization behaviour is for an individual to respond to an episode of ill-health by seeking first and foremost help from a trained allopathic doctor, in a formally recognised health care setting. Yet, a consistent finding in many studies is that, for some illnesses, "*people will choose traditional healers, village homeopaths, or untrained allopathic doctors above formally trained practitioners or government health facilities* "(Tipping and Segall, 1995). Similarly, certain health problems may be better dealt with by self-care, at home or community level in a more cost effective way. Assumptions that modern health institutions are not helpful for certain disease conditions appear to be the main reason for low utilization of these services. This is also confirmed by Yamasaki-Nakagawa et al (2001), who found that women in Nepal were more likely to seek help from traditional healers first. Moreover, the scale of this may be reflected in findings from a recent study by Rahman (2000), in rural Bangladesh, where a majority of women received health care from non-qualified health care providers. The responses made to illness depend on the kind of illness as well as who is struck and when (Lewis, 1981). In every society there are some conventions about how people should behave when they are ill. In every culture there are ideas about the significance of different signs or symptoms of illness. The extent to which such conventions and expectations can determine how someone behaves when ill varies with the disease he/she suffers from. There will be some diseases which impose their effects so severely or suddenly that there is little chance for the sufferer to adjust or modify his response to them (Lewis, 1981).

In acknowledgement of the fact that untrained non-Western practitioners remain a strong favourite, Outwater et al (2001) interviewed traditional healers about their knowledge and relationship with 'modern' medicine, and explored in far more depth the preferences of women who attended traditional healers and unofficial sources of health care. Through this they recognized, as have others (Moses et al., 1994) that some groups appear to 'wander' between practitioners rather than seek care through one avenue or provider. Similarly, Rahman (2000) in a study conducted in rural Bangladesh found that different facilities will be frequented for different needs, according to a complex interplay of factors, sometimes regardless of the intended purpose of those facilities.

Although there is consensus that health service use clearly varies for the same individuals or communities when faced with different illnesses; and that people normally seek more than one form of health care during the course of an illness; most studies support the view that health care should be sought first and foremost from modern health facilities and tend to discount traditional

healers. In most of the studies, the informal health sector has often been ignored. Studies tend to focus specifically on the act of seeking 'health care' as defined officially in a particular context. Although data are also gathered on self care, visits to more traditional healers and unofficial medical channels are often seen largely as something which should be prevented, with the emphasis on encouraging people to opt first for the official channels (Ahmed, et al., 2001).

In theory, treatment options are available to all seekers although, in practice, not all are utilized. This may be due to several reasons, the main one being the cost of accessing the particular health care alternative. In fact, patients do not always get the anticipated outcome and they have no sure way to determine the type of treatment alternative that will yield the desired state or the best results. Although unable to pre-determine treatment outcomes, patients still must prioritize their decisions. They must first order the alternatives available according to rules of preference and then decide on a strategy with a perceived good chance of leading to the desired results (Fjellman, 1976). If a particular treatment choice fails, patients or the person(s) responsible for their health may make new choices. As time passes, and if the illness persists, the patient becomes desperate and receptive to therapy suggested by others (Feierman, 1981; Agyepong, 1992). Deciding what treatment option to take does not always follow the same sequence in the same individual during different episodes of an illness nor need it be the same in different individuals.

Reniers and Terfal (2009) in a study that was conducted in Ethiopia report that both holy water and traditional healer visits are more often for TB/HIV deaths, and suggests that those who die of TB/HIV are more likely to also visit a medical facility primarily, but not exclusively, because of the longer duration of their illness. More important is that the utilization of these alternative curative options does not seem to co-vary in any consistent manner with the utilization of modern medical services, suggesting that they are used as complements for each other rather than alternatives.

In addition, Reniers et al., (2005) show that over 85% of all terminally ill patients in Addis Ababa visit a medical facility prior to death, for AIDS patients this is even above 95% .This is confirmed by a study conducted by Case et al (2005) in Kwazulu-Natal who maintain that it is possible that patients are discharged from medical facilities once physicians realize that the prospects for improvement are grim and as a result revert to more miraculous forms of healing. To confirm this view, Pronyk et al (2001) found that TB patients in South Africa attended government facilities more readily than for certain other conditions. 72% presented initially to a

hospital or clinic, with only 15% presenting to a spiritual or traditional healer, and 13% to a private doctor.

However, studies conducted in rural Kenyan community and in Malawi (Nyamongo, 2002; Hatchett et al (2004), emphasize that for conditions like malaria and AIDS, the first line of treatment is often self-medication. The failure of these remedies triggers the exploration of other treatment options, which may or may not include traditional providers. Studies carried out in developing countries like north-eastern Tanzania, African urban areas and in rural Tanzania suggest that the order in which health providers are explored suggest that patients expand the range of therapy with a longer duration of illness, and possibly also as their condition deteriorate (Feierman, 1981; Kroeger, 1983; Develay et al., 1996; Ngalula et al., 2002).

Age pattern of health services use suggest that teenagers and the elderly are the least likely to use a modern health facility. Probable reasons for lower health care utilization in older age are the lack of mobility in the elderly (Kloos et al., 1987), or the unequal distribution of household resources for health care. Similarly, Faussett et al (2002), asserts that older patients are more likely to have frequent illness and are more dependent on other people to be taken to a health institution thus making it difficult for them to visit health facilities on all episodes of sickness.

Research done in south-east Nigeria and Malawi, respectively, by Uzochukwu and Onwujekwe (2004) and Kazembe (2007) suggest that the household resource base and availability of funds at the time of illness are important determinants of health-seeking behaviour. Treatment choice involves several factors including historical patterns of use, illness type and severity, pre-existing lay beliefs about illness causation, the range and accessibility of therapeutic options and their perceived efficacy, convenience, opportunity costs, quality of service, staff attitudes as well as the age, gender and social circumstances of the sick individual (Kleinman 1980; Young 1981; Kleinman and Gale 1982; Helman 1995; Tipping and Segall 1995; Berman and Dave 1996). The type of illness may also have a bearing on utilization of modern health services. A study in former Shoa province of Ethiopia reported that leprosy patients with disability grade II more often resorted to traditional practitioners than modern health services (Amenu et al., 2000).

Individuals seeking care for illness are usually realistic. They turn to different health care systems according to their subjective assessment of the problem and of the most suitable type of help (Leeson, 1974). In doing so, they test their decisions. If one remedy does not work, they will turn to another. The more severe and prolonged the disease, the more likely is the individual to

seek alternative health services when a previously chosen option fails (Heggen-hougen, 1980). Justice (1981) found that for most illnesses, patients delayed seeking professional help and used home remedies instead. If the problem continued, traditional healers were the next step. According to Justice (1981), modern health care services in Nepal were sought only as a last resort, usually for serious and persistent problems.

Therefore there is need to ascertain health-care seeking behaviour during terminal illness and assess the extent to which adults of terminal illness use multiple providers and check if they first consult modern health facilities or otherwise, especially so in the era of HIV treatment using ART and given the fact that HIV/AIDS is a chronic illness.

2.1 Conceptual Framework

Studies demonstrate that the decision to engage with a particular medical channel is influenced by a variety of socio-economic variables (predisposing and enabling factors) such as sex, age, education, financial resources to purchase services etc; and need factors including total number of sick days for a reported illness, type of illness -chronic or acute; severe or trivial (Tipping and Segall, 1995) as indicated in the literature review. There may be both indirect and direct effects from predisposing and enabling factors that influence use of health services.

The Andersen or behavioural model used in studying health-care utilization provides the most holistic framework for examining, analysing and interpreting factors and determinants of health-care seeking behaviours particularly for developing countries (Andersen, 1995).

Therefore, an adaptation of the model is proposed for studying health-care seeking behaviour in terminal illness (Figure 1). The model was specifically developed to investigate the use of biomedical health services; later versions have extended the model to include other health care sectors, which include traditional medicine and domestic treatments (Weller et al. 1997). The model centres specifically on treatment selection and Weller and colleagues (ibid) emphasise its particular use in working with statistical data on actual cases. In view of the fact that this study was done in Ethiopia, a developing country, and the fact that the study focuses on health services use by cause of death, the model is very useful, providing appropriate direction to the study and suits with the nature of data (actual number of deaths with determined cause of death). Most of the identified factors by the model are also available in the data and will be used with minor variation as both explanatory and dependent variables in the analysis. However, the current study will not deal with health insurance (although well known to influence use of health services in

developed countries), due to non-availability of data and to their non-inexistence in Ethiopia. The exact variables chosen for analysis are well covered in the methodology section.

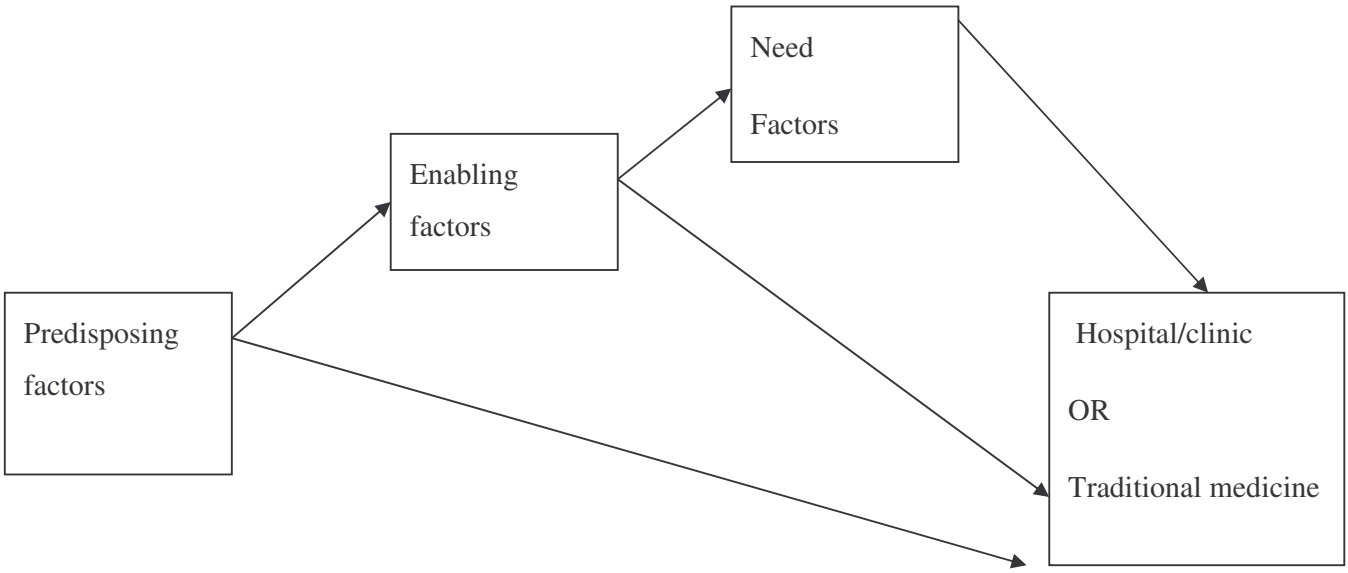


Figure 1: Adaptation of Andersen's Behavioural Model for Health care utilization

An important difference between the reference model and an adaptation of this model is that predisposing factors will only include age, gender, religion, and formal education. Issues around attitude and knowledge towards health services are beyond the scope of this study. In the same manner, the enabling factor is economic status as a proxy to availability of financial resources and the need factor is type of illness. And lastly, treatment choice is traditional services and hospital (modern) services (the dependent variable).

The model has been used to examine user related factors that influence the utilization of medical care facilities in developing countries to gain evidence on the weight of different factors for health service use. Based on the data of Demographic and Health Surveys, a comparative study of six sub-Saharan African countries has been carried out, using the categories proposed by Andersen (Fosu, 1994), and the model has also been used for studying health-care seeking behaviour for malaria (Rauyajin, 1991).

3 RESEARCH METHODOLOGY

3.1 Source of data

The study used data collected by Addis Ababa Mortality Surveillance Project (AAMSP). The data was obtained from interviews with close relatives and/or primary caretakers of the deceased. In these interviews, also referred to as Verbal Autopsies (VAs), the caretakers are asked about the signs and symptoms the deceased suffered from during terminal illness. VA is an indirect method of ascertaining biomedical causes of death from information on symptoms, signs and circumstances preceding death, obtained from the deceased's caretakers (Soleman et al.,2006). VA has been widely used as a method of ascertaining causes of death in children in places where the majority of deaths occur without medical supervision (Anker et al., 1999) .There has been a growing interest in the use of VA in the context of disease surveillance and sample registration systems, particularly for causes of death in adults (Setel et al., 2005). VA has been used not only to gather data on the cause-of-death structure of certain populations, but also in investigations of infectious disease outbreaks and risk factors for certain diseases, and measuring the effect of public health interventions (Andraghetti et al., 2003).

A standard VA tool comprises a VA questionnaire, cause-of-death or mortality classification system, and diagnostic criteria (either expert or data-derived algorithms) for deriving causes of death. There are a number of advantages of VA method over death certification: it does not require medical expertise in data collection; and it's relatively cheap and require low technology.

The VA process involves first to define the population of interest and identify all deaths; approach relatives of all the deceased for history of illness before death; develop syndromic definitions of the likely cause of death; then identify the cause of death for each case after expert assessment of the results of interviews with the bereaved; and lastly create and implement a process of validation and quality control using hospital or real autopsy data. Unfortunately, our VA data could not be checked for quality as there were no such external data sources to validate the procedure.

3.2 Data Collection

Data was obtained from a series of questions about deceased health services utilization including, but, not limited to whether deceased ever visited a hospital or clinic during illness and ever visit a traditional healer/ holy water source/ witch doctor for the condition that led to death; and if such visits occurred before, after, or in between clinic and hospital visits. Information was also collected about the duration of the illness from the time when the deceased started to show signs of sickness; as well as information on deceased's level of education and economic conditions of the household, such as availability of water and electricity and other assets such as ownership of a television set and mobile phone.

"*The VA were conducted by a team of two trained community health workers who visit the household two to four weeks after the death. Cause of death was ascertained by means of a physician review. Two physicians independently assign an underlying cause of death. If the assigned ICD-10 code (three digits) for the first two physicians does not match, the VA questionnaire was reviewed by a third physician. If the third assessment did not support either one of the previous diagnoses, the case would then be settled by consensus. When all three disagreed the case was then assigned to an undetermined cause of death-category*" (Reniers et al., 2005).

Holy water (*tsebel*) visits are a practice among Orthodox Christians, the Muslim equivalent (*zemzem*) is not as common and is not queried in the VA interviews and thus not included in analysis.

3.3 Study design

The study was a secondary data analysis of the 2007 Addis Ababa mortality surveillance project. It was based on mortality data that was collected using burial site surveillance followed by a verbal autopsy interview with the relative/caretaker. The sample is comprised of 1066 individuals above 12 years who died and were buried in the Addis Ababa city cemetery in November and December of 2007. The sampling frame for this study consists of all deaths (adults and teenagers above 12 years) excluding cases for which identifying information (that is name, age, and address) was incomplete or missing. Those buried out of cemeteries are assumed to form a negligible proportion, while those who died in the city but were buried in Cemetery out of Addis Ababa are not accounted for.

3.4 Population

The study was carried out in Addis Ababa the capital and largest city of Ethiopia, located at the centre of the nation in the mountainous Shawa Province at the foot of Mount Entoto and is surrounded by Oromia. The city is populated by people from different regions of Ethiopia, with a total population of 2,738,248 according to the 2007 population census. With an estimated area of 530.14 square kilometres, this city has an estimated density of 5,165 inhabitants per square kilometre.

3.5 Variables and variable definition

Dependent variable

The outcome of interest *is health service use or type of treatment*. This variable is defined as the first point of contact for health services. It is divided into three groups; namely no treatment, first hospital/clinic and first traditional healer. The 'first hospital' category includes those individuals who consulted hospital/clinic as the first choice for health-care, considered as the dominant over the exposure period. The first 'traditional healer' group include those people who went to traditional healers. Due to the small number of those who visited holy water sources and witch doctors, they were combined with those who used traditional healers. The 'no treatment' category includes those who did not report going to the hospital or using any other provider and instead used home remedies, bought over the counter medication that was not prescribed and/or used no treatment at all.

Main independent variable

The main independent variable is *cause of death* based on the International Classification of Diseases (ICD10 code). The variable cause of death (i.e. type of illness) is referred to as need factor and it has five groups namely; HIV/AIDS+TB); deaths from diseases of the circulatory system (defined as deaths from hypertensive and ischemic heart diseases, diseases of veins, arteries, arterioles, capillaries, lymphatic vessels and lymph nodes, and other disorders of the circulatory system); deaths from diseases of the respiratory system (i.e. acute upper and lower respiratory tract infections, influenza, pneumonia and other non-TB lung disorders); and deaths dues to cancer or malignant neoplasm (these include cancer of the digestive and respiratory organs, cancer of the genital organs, cancer of the skin, urinary tract, eye, brains and other parts of the nervous system) and lastly deaths due to injuries and other causes.

Other covariates used according to the Andersen model:

Predisposing factors

Age was used because it has been reported that the very young and elderly have restricted access to health care due to mobility problems.

Gender since studies show that there are gender differences in patterns of mortality as well as in use of health care.

Education was used because people who are better educated are more likely to opt first for modern health services than their less-educated counterparts. Additionally, education has an impact on access to health information and aid the understanding of such information.

Marital status was used because it is likely that spouse support and advice can influence choice of health services.

Religion was used since it has been reported that religion also influences HCSB, as studies find people to opt for holy water especially among the orthodox.

Ethnicity was used because health service utilization is likely to be influenced by customs and norms depending on where people originate from.

Enabling factors

Economic status was used because it influences access to and affordability of health services. The poor are likely to resort to cheaper forms of healing. The limitation of this variable is that it is a subjective measure of economic status as perceived by the interviewer based on appearance of respondents' household.

Occupation was used since it determines someone's income and thus has an effect on use and access to health care as well as determines exposure to certain diseases.

Availability of water in the household because water has direct effect on health since people can die from water borne diseases associated with use of unclean contaminated water, which can influence the degree of vulnerability.

Duration of illness/exposure was used as a control variable because it measures the exposure to sickness and can influence the use of health services as it's expected that people will try different forms of health care for their sickness the longer the duration of illness.

3.6 Data Analysis

Statistical analysis was done using STATA package version 9. The analysis was based on the cases with an established cause of death using the ICD10 code (based on the 10th revision by World Health Organization version for 2007). Firstly, cause of death was encoded into HIV/AIDS+TB deaths; deaths due to diseases of the circulatory and respiratory system; deaths due to malignant neoplasm (different types of cancers) and injuries and other causes of death were singled out for analysis. The category injuries and other causes of death includes deaths due to external injuries, murder, road accidents, suicide, infectious and parasitic diseases, mental and behavioural disorders, diseases of the nervous, digestive and genitourinary systems and all other causes of death both specified and unspecified. The study grouped external injuries into other causes of death because injuries if analysed as a category on its own may lead to an unusual contact pattern with health service providers. TB and HIV/AIDS deaths are combined because it is often difficult to distinguish the two on the basis of a VA interview.

Secondly, three aspects of health services utilization were considered: ever visited a hospital/clinic prior to death (yes/no); ever visited a traditional healer for the condition that lead to death (yes/no); and ever visited a holy water source (yes/no). These measure the use of health services. Traditional healers (*yebahel medhanit awaq*i) are the main providers of alternative, mainly herbal, medical services. The VA questionnaire also contained a question about consulting witch doctors (*awaqi*), for convenience purposes in the analysis such visits and visits to holy water sources are combined with traditional healer because of the small proportion of those who visited such providers.

The following steps were to ascertain the order of treatment. This variable was derived from the question related to hospital visit, whether hospital visit was prior or after visit to traditional healer/holy water, that is which health service providers were contacted first and the successive ones. We identified some inconsistencies between questions regarding the order of treatment of the deceased and the question regarding hospital treatment. Some respondents answered "no" to the question '*Did deceased ever visit a hospital for the condition that lead to death?'*, then on the follow up question '*Did deceased visit the traditional healer/holy water source before or after*

hospital visit?', some respondents mentioned hospital visits (89% in case of traditional visit, 76% in case of holy water visit: see details in first column of Table 1 and 2 below).

Table 1: Order of traditional treatment and visit to hospital for treatment

	Ever visited hospital for treatment:		
Time of visit traditional healer:	**No**	**Yes**	**Total**
Before hospital visit	12	25	37
After hospital visit	0	9	9
In between hospital visit	4	10	14
Did not go to hospital	2	0	2
Total	18	44	62

Table 2: Order of holy water treatment and visit to hospital for treatment

	Ever visited hospital for treatment:		
Time of visit holy water:	**No**	**Yes**	**Total**
Before hospital visit	34	70	104
After hospital visit	4	44	48
In between hospital visit	27	90	117
Did not go to hospital	21	0	21
Total	86	204	290

It is probable that the respondent understood the second question (on the order of treatment) wrongly. In particular, when the patient died at hospital, the respondent might have considered it a hospital visit although the patient did not seek or follow treatment at this hospital. Also, some visits to hospital might have been considered literally as visits only in case they have not lead to a modern treatment for the condition of the deceased. This may occur when the modern treatment, in form of medication and procedures, is not affordable.

Therefore, we constructed a variable on the order of treatment (Table 3) where hospital treatment appears only for individuals that were declared to have received hospital treatment. When hospital is referred before, after or in-between traditional or holy water visits, it is discarded when the answer is "no" to the question '*Did deceased ever visit a hospital for the condition that lead to death?'*. Then, order of treatment is grouped by first choice of health-care, classified into three categories namely those who chose no treatment, those who consulted a hospital first and lastly a group of those who first sought care from traditional healers or holy water. First choice of type of health care is the focus because figures for most categories of order of treatment were too small (see table 3 below). In the case when hospital is the first order of treatment, we

assumed that it was the dominant one. Even when deceased chose a traditional/holy water treatment after hospital, most of them (86 out of 131: 65.6%) actually returned to hospital before dying. In the case when hospital came after traditional or holy water (81 out of 178: 45.5%), we assume that the deceased was brought to the hospital at a last resort when the conditions became critical and that it was not the dominant treatment. In sum, the first choice of health-care is assumed to be the dominant form of treatment.

Table 3: Order of Treatment

TREATMENT	FREQUENCY	PERCENT
No treatment	**396**	**37.2**
Hospital only	361	33.9
Hosp→Trad	5	0.5
Hosp→Holy	38	3.6
Hosp→Trad→Holy	2	0.2
Hosp→Trad→Hosp	5	0.5
Hosp→Holy→Hosp	81	7.6
Total Hospital as first treatment:	**492**	**46.2**
Traditional only	9	0.8
Holy water only	78	7.3
Trad→Holy	10	0.9
Trad→Hosp	14	1.3
Trad→Holy→Hosp	2	0.2
Holy→Hosp	65	6.1
Total Traditional Healer or Holy Water as first treatment:	**178**	**16.7**
Total	**1066**	**100**

For the aforementioned reasons, therefore a combination of order of treatment by first choice of health care gives sufficient figures for analysis purposes. To illustrate this point, the category of those who visited hospital first then went to traditional healer was about 0.5% only, those who visited traditional healer first then went to hospital was 1.3%, and those who first consult a hospital followed by either holy water or traditional healer was 0.2%, etc (for details refer table 3 above). Out of our 1066 sample, 47% received no treatment. Among patients who visited hospital first (46% of the whole sample), only 27% sought additional care from traditional healers or holy water, of which two third died in hospitals anyway. Among patients who sought first care with traditional healers or holy water (17% of the whole sample), 46% ended up dying in hospitals. However, this might not necessarily reflect modern treatment, as many of these

patients might have been brought in a hospital when dying, as a last resort. In other words, the first point of contact is better reflecting the dominant type of treatment that the patients received during terminal illness.

One of the predictors of health services use is socioeconomic status. It was defined in terms of asset ownership that is ownership of a telephone or mobile, ownership of a television set and availability of water in the household and economic status of the household judged by the interviewer based on the appearance of the respondent's house; and it was classified as very well-off, well-off, average, poor and very poor. Electricity and ownership of a car were not included in the analysis due to small number of those who do not have electricity, and also because very few individuals reported having a car.

The variable 'ever used ARV' was dropped from the analysis because very few individuals answered yes, indicating significant underreporting.

Descriptive statistics was used to explore the relationship between health service use (the dependent variable) and cause of death together with other covariates age, gender, education, marital status, occupation, economic status, religion and ethnicity. Bivariate analysis was also used to investigate the strength of the association between health service use and cause of death and the covariates and to check if the relationship is significant or otherwise.

In the multivariate analysis, multinomial logistic regression was used because both the response variable-health service use was categorical with more than two categories. The study used multinomial model using the bootstrapped standard errors technique (more than 425 successful replications out of 500) to reduce any effect that outliers might have on the regression equation and to account for unusual variability between individuals. This was necessary since the sample size for the study was small and as such few individuals could greatly influence the results. All the covariates were at the same time introduced into a multivariate model to determine their net effect on type of treatment or use of health services. Duration of illness was used as a control variable because it measures exposure and it was defined as length of time the deceased first started to show signs of being ill.

Lastly, in the analysis those who answered 'don't know' to specific questions have been included as a separate category because deleting them would make the sample size too small. Here, an assumption was made that these individuals were missing at random that is the study makes an implicit assumption that the distribution of dependent variable (type of treatment) is distributed

the same way for missing and non-missing values. But, ‘don’t know’ category is included in the tables of results but not commented on in the interpretation and discussion of results.

4 RESULTS AND DISCUSSION

4.1 Descriptive Statistics

Table 4 below reveals that irrespective of cause of death, a majority of the deceased (46%) first consulted a hospital or clinic during their illness and 17% first went to a traditional healer and about 37% had no treatment. The 'no treatment' category has a high frequency as it may contain individuals who used home remedy and over the counter medication from pharmacies or street vendors to treat their illness. Since the VA had no question regarding the use of home or self-treatment those who did not go to hospital, traditional healer or holy water fell into the 'no treatment' category.

Table 4. Frequency distribution of deceased by cause of death and type of treatment

	Number	**Percentage**
Cause of Death		
Injuries+other causes	392	36.8
HIV/AIDS+TB	321	30.1
Circulatory disease	222	20.8
Respiratory disease	39	3.7
Cancer	92	8.6
Type of treatment		
No treatment	396	37.2
Traditional first	178	16.7
Hospital first	492	46.2
Total	1066	100

Results also indicates that there were 37% deaths due to injuries and other causes and 30% of HIV/AIDS+ TB deaths; while about 21% of the deaths were due to diseases of the circulatory system (i.e. hypertensive and ischemic heart diseases, diseases of veins, arteries, arterioles, capillaries, lymphatic vessels and lymph nodes, and other disorders of the circulatory system). Almost 4% of the deaths are due to diseases of the respiratory system (acute upper and lower respiratory tract infections, influenza, pneumonia and other lung disorders) and about 9% were cancer deaths (cancer of the digestive and respiratory organs, cancer of the genital organs, cancer of the skin, urinary tract, eye, brains and other parts of the nervous system). HIV/TB deaths also have a high frequency (30%) probably due to low socioeconomic status of the population as a majority are from poorer households and this hindered access to proper nutritious diets, sanitation and inefficient management of opportunistic infections, although ARVs have been

freely available in public hospitals from October 2005. Deaths due to HIV/TB might have been underreported due to stigma attached to AIDS. The results indicate that the leading cause of death is injuries and other causes (this category also includes murder, suicide and undetermined causes of death) followed by HIV/AIDS+TB, diseases of the circulatory system and cancer. A small proportion of individuals died from diseases of the respiratory system. A probable reason for the low frequency of deaths from non-TB respiratory system infections may be that those who suffered from respiratory diseases were found by the study to be more likely to first seek care from hospital/clinic (rather than from traditional healers) where their illness can be properly diagnosed and treated resulting in fewer deaths. The high frequency of HIV/AIDS+TB deaths can be due to the fact that HIV/AIDS and TB deaths were grouped together since it is hard to differentiate them on the basis of a verbal autopsy.

The respiratory diseases are few as a result of excluding the TB infections from that category; thus, respiratory diseases were influenza, pneumonia and other non-TB lung disorders. Also one possible reason for the high frequency of deaths in the category of injuries and other causes of death could be due to the fact that this category included deaths due to external injuries (transport accidents) and deaths resulting from suicide, murder and other undetermined and unspecified causes of death which all together make a big category.

Table 5 below shows that over half of those who had no treatment, died from injuries and other causes of death, while approximately one in every five of HIV/AIDS+TB deaths had no treatment. Also, for no treatment 20% of deaths were due to diseases of the circulatory system, 3.5% died from diseases of the respiratory system, and only about 4% are cancer deaths. The category of those individuals who died from injuries has a high frequency of no treatment probably because injuries normally result in sudden deaths.

Table 5. Percentage distribution for dominant type of health care bycCause of death, gender and marital status

	Use of Health care		
Covariate	No-Treatment	Hospital first	Traditional first
Cause of Death			
Injuries+other causes	50.5	30.7	23.0
HIV/AIDS+TB	21.2	32.1	44.4
Circulatory disease	20.7	22.0	18.0
Respiratory disease	3.5	4.9	0.6
Cancer	4.0	10.4	14.0
Gender			
Male	56.3	50.8	33.2
Female	43.7	49.2	66.9
Marital status			
Never married	26.5	20.1	31.2
Married	41.7	41.1	30.7
Separated/divorced	7.7	10.5	8.5
Widowed	24.2	28.3	29.6

In two disease categories, HIVAIDS and cancers, use of traditional treatment first was more common. In only one category, 'injuries and other causes', most cases sought no treatment at all – a finding that is partly due to sudden deaths, whereby treatment was actually not sought for. For full results on other covariates like age, education, etc, refer to appendix II.

4.2 Bivariate Analysis

In both the bivariate and the multivariate analysis, the study will control for the duration of illness by including in the covariates this duration in months of exposure to illness. However, the variable exposure or 'duration of illness' will not be interpreted as such. It will only serve as a control variable, so that other covariates can be rightly interpreted, duration of illness being equal. To note, 'injuries and other causes' were chosen as the reference category for causes of death in regression analysis, as they are both the most frequent causes and also had the shortest median exposure (0.42 year; i.e. 0 for injuries and accidents that account for 7.6% of all deaths, and .67 years for other causes, accounting for 29.2% of all deaths) as opposed to the other categories where the duration of illness is longer (1 year for HIV/TB, 1.3 year for circulatory

disease and malignant neosplasm) except for respiratory disease (0.2 year). The full results of bivariate analysis are available in Appendix II.

4.2.1 Likelihood of seeking care from traditional healer first

Effect of predisposing factors

The results show that males compared to females are less likely ($p<0.01$) to visit a traditional healer first rather than having no treatment. All the age groups were less likely to first seek help from a traditional healer compared to the reference (aged 35-44), but this is not significant except for the age group 85 ($p<0.05$). The results suggest that the higher the level of education, the less likely an individual to first seek help from a traditional healer rather than having no treatment, but this trend was not statistically significant. The never married and widowed were 2 times more likely ($p<0.05$) to have first visited traditional healer than the married, while the separated/divorced were also 1.5 times more likely to first opt for a traditional healer compared to those who are married. Orthodox Christians and Muslims are equally likely to visit traditional healer as the first point of contact for health care rather than having no treatment. Results also reveal that ethnicity is not significant (Refer to full results of bivariate model in appendix III).

Effect of enabling factors

For occupation, the retired and employees compared to housewives are less likely ($p<0.05$) to seek help from a traditional healer first rather than having no treatment. Individuals who were very well-off in terms of relative economic status were also shown to be less likely ($p<0.05$) to first visit a traditional healer than average economic status. But, the poor and very poor compared to those of average economic status, were almost twice more likely to visit a traditional healer first rather than having no treatment. It is possible that the poor do not have the financial resources to gain access to modern medical treatment for their conditions. Source of water and ownership of television has no effect on the odds of using traditional medicine first compared to no treatment, however, those without mobile phones were twice as likely to visit a traditional healer first compared to those with phones.

Effect of Need factors

The cause of death has a significant effect on the type of health-care or type of treatment used. The bivariate model revealed that those whose cause of death was HIV/AIDS+TB were 5 times more likely to have first consulted a traditional healer rather than having no treatment compared

to those who died of injuries and other causes of death ($p<0.01$). Similarly, those who died of cancer were 8 times more likely to visit a traditional healer first than those who died of injuries and other causes ($p<0.01$). And, those who died from diseases of the circulatory system were twice as likely to first visit a traditional healer ($p<0.05$). Those who die from respiratory disease were less likely to have first visited a traditional healer.

4.2.2 Likelihood of seeking care from a hospital/clinic first

Effect of predisposing factors

The data indicate that compared to women, males are less likely to visit a hospital first rather than having no treatment. Ages 12-24 were less likely to first visit a hospital compared to age group 35-44 ($p<0.05$). Individuals aged 65-74 were about 2 times more likely to have first visited a hospital than age group 35-44.

Those with secondary and tertiary education were less likely to first consult a hospital/clinic ($p<0.01$) rather than having no treatment, which is unusual. With respect to marital status, the separated/divorced, widowed and the married are equally likely to first visit hospital rather than having no treatment. Also, the never married were shown to be less likely to consult a hospital first compared to those who are married. However, this effect did not prove to be significant.

The odds of visiting a hospital first are equal for Muslims and Orthodox but Catholics and Protestants were less likely to have sought care from a hospital first. This effect was not statistically significant. Similarly, the effect of ethnicity on type of treatment was not significant.

Effect of enabling factors

With regard to occupation, students were less likely ($p<0.01$) to first seek care from a hospital/clinic rather than having no treatment. Results indicate that for economic status the very poor are about 2 times more likely to consult a hospital rather than having no treatment when illness strikes compared to those with average economic status. However, the very well-off were found to be less likely to visit a hospital first. Those with high and average social economic status seem less likely to use modern medical facilities like hospitals and clinics than the poor. Source of water and ownership of a television set has no effect on the likelihood of consulting a hospital as the first point for treatment. Those who do not own a telephone are about 2 times more likely ($p<0.05$) to first seek care from a hospital.

Effect of Need factors

The results from table 3 above show that there is significant relationship between cause of death and the type of health care used. Data indicate that those who died from HIV/AIDS+TB and cancer are more likely ($p<0.01$) to visit a hospital/clinic first rather than having no treatment compared to those who died from injuries and other causes (3 times and 4 times, respectively). Similarly, those whose cause of death was circulatory and respiratory disease were about 2 times more likely to first consult a hospital/clinic compared to those who died from injury and other causes.

4.3 Multivariate analysis

Table 6 below presents the results of the multivariate analysis for the three most significant variables. The results show that cause of death, gender and marital status are important predictors of choice of health service used. Whereas age, education, occupation, religion, ethnicity, availability of amenities and economic status are not important factors in predicting first point of help for health service. The full results are available from Appendix II.

Effect of Predisposing and enabling factors

It is of interest to compare the gender and age characteristics of the patients who visited hospitals or traditional healers to those who had no treatment. The results reveal that compared to females, males are less likely ($p<0.05$) to seek help from a traditional healer first rather than having no treatment. Also, males were 2 times more likely ($p<0.05$) to seek care from a hospital first as opposed to seeking care from traditional healers. This implies that females more often opt for traditional healers, this finding concurs with another study that noted that the majority of those seeking the help of traditional healers were women (Ahmed et al., 1999). The study found that health service utilization does not depend on age.

It was found that those never married were about 3 times more likely to visit a traditional healer, and 2 times likely to consult a hospital rather than having no treatment. Those who are separated, widowed and divorced, are more likely to first consult traditional healers when seeking health care than go for no-treatment. When comparing use of hospitals as opposed to use of traditional healers; the study found that health seeking behaviour between traditional and modern services does not vary by marital status. The current study did not pick up the marriage cushion for health; one would expect a different pattern where the single supposed to be more careless and as such going less to hospital. Also, religion and ethnicity have no significant effect on the use of

health services. This is contrary to previous studies which noted that sociocultural and religious backgrounds essentially determine sources of prevention and cure of particular health problems/illness (Airhihenbuwa, 1987).

Table 6. Multivariate Model: Relative risk ratio of dominant type of health care by cause of death, gender and marital status

	Hospital /No treatment RRR [95% CI]	**Traditional healer /No treatment RRR [95% CI]**	**Hospital /Traditional healer RRR [95% CI]**
Cause of Death			
Injuries+other causes	Ref	Ref	Ref
HIV/AIDS+TB	3.1*** [2.0-4.8]	4.3*** [2.3-8.2]	0.7[0.4-1.3]
Circulatory disease	1.3 [0.8-2.0]	1.5 [0.8-2.8]	0.9[0.5-1.7]
Respiratory disease	1.7 [0.7-4.0]	0.3 [0-∞]	5.3[0-∞]
Cancer	5.1*** [2.4-11.1]	6.7*** [2.7-16.5]	0.8[0.4-1.7]
Gender			
Female	Ref	Ref	Ref
Male	0.9[0.5-1.4]	0.4** [0.2-0.8]	2** [1.1-3.6]
Marital status			
Married	Ref	Ref	Ref
Never married	1.7*[1.0-2.9]	2.8*** [1.4-5.8]	0.6[0.3-1.2]
Separated/Divorced	1.2 [0.6-1.6]	1.1 [0.4-2.5]	1.1[0.5-2.4]
Widow	1.0 [0.6-1.6]	1.2 [0.6-2.1]	0.9[0.5-1.6]
Don't know	0.8[0.0-∞]	1.8[0.0-∞]	0.4[0-∞]
Exposure	1.0*** [1.0-1.0]	1.0*** [1.0-1.0]	1.0[1.0-1.0]
Exposure ^{2}	0.9* [0.9-0.9]	0.9 [0.9-0.9]	1.0[1.0-1.0]

Key to Table 6:

Ref	Indicate the reference categories.
***	Very significant: we are working within a 99% confidence interval at a 1% (0.01) level of significance. The numbers in brackets also represent the confidence interval whereby the observed relative risk (of choosing a particular type of health service) is expected to fall somewhere in the range given by the interval.
**	Significant at 5%
*	Hardly significant (10% level of significance).
RRR	Relative Risk Ratio

With respect to sociodemographic characteristics of health care users, the findings of the multivariate analysis indicate no significant differences by perceived socioeconomic level, which is unexpected. One would expect those with a higher income to seek care from modern medical facilities as they have the financial resources to gain access to such facilities and generally they are more educated. This could be due to data inconsistency and problems where the majority of the poor reported ownership of mobile phones and television sets while only a small percentage of the well-off reported owning such assets. Previous investigations in urban areas revealed a relatively high use of modern medical services by the better educated and by those with high incomes (Peltzer and Mngqundaniso, 2008). Perhaps surprisingly, the findings also indicate that financial status of the household seems to have no effect on the choice of health care facility (measured by economic status, ownership of TV and/or telephone and availability of water). This is contrary to previous research which suggest that household resource base and availability of funds at the time of illness are important determinants of health service use (Uzochukwu and Onwujekwe 2004; Kazembe 2007). A probable explanation of no effect of economic status on choosing type of treatment may be due to the fact that the three variables (source of water, ownership of TV and telephone) did not capture economic status well due to data inconsistency and quality issues.

Effect of Need factors

Perhaps the most important finding of the present study is that cause of death has a highly significant effect on use of health-care services. Results from the multivariate analysis presented in Table 3 above show that those who died from HIV/AIDS+TB, compared to people who died from injuries or other causes (reference category) are 4 times more likely to visit a traditional healer first rather than to have no-treatment. This is in line with previous research in Addis Ababa which shows with almost similar techniques that traditional healer visits are more often for TB/HIV deaths (Reniers et al 2005). Clearly, these findings are of concern, given the possibility of adverse side-effects of traditional medicine on antiretroviral therapy or toxic interactions and other problems such as termination of treatment by HIV and TB patients after traditional healers instruct them to do so. This finding emphasizes the importance and need to work with the traditional health sector. With respect to cancer patients, the regression shows that they were 7 times more likely ($p<0.01$) compared to the reference category to first visit a traditional healer than to have no-treatment. These results could be explained by the fact that those who suffer from HIV/AIDS+TB and cancer may resort to traditional healers because they

are suffering from terminal illness characterized by a long duration of sickness with various symptoms with different degree of severity, thus predisposing the patients to use multiple providers while also using miraculous forms of healing including traditional healers. Another reason may be because of the social stigma associated with HIV/AIDS+TB disease; individuals suffering from these diseases consider traditional healer as more discrete, avoiding to go to hospitals in fear of being seen by neighbours, relatives or friends especially so if the hospital/clinic deals with people living with HIV/AIDS (provision of ARVs, and management of patients with side effects and complications related to treatment). Since non-TB respiratory tract infections such as pneumonia and flu have no stigma attached to them, patients readily seek care from hospitals as evidenced by the results. However, cancer is also associated with traditional healing, although cancer is not particularly subjected to social stigma.

The consultation with traditional healers by HIV/TB and cancer patients may be better explained by the fact that traditional forms of health services have a lesser social distance compared to formal modern health services, in the sense that traditional healing also serves to provide meaning to a person's experience of sickness or to explain the meaning of the disease for that particular person. Studies suggest that people suffering from HIV/AIDS and cancer normally resort to different forms of healing and use several health care providers because of the long duration of these disease and the various complications that arise from them like opportunistic infections due to HIV/AIDS and other health threatening effects of cancer (Feierman, 1981; Kroeger, 1983; Develay et al., 1996). As time passes, and if the illness persists, the patient becomes increasingly desperate and receptive of alternative treatment or therapy, including traditional healers (Reniers at al 2005). Moreover, for most inhabitants of developing countries, access to local folk or traditional sources of health care is easier than access to modern health care. This study did not investigate the reasons why patients chose to use particular forms of health care service. The similarity in use of health care between HIV/AIDS+TB and cancer patients has been noted for both the bivariate and multivariate analyses and the same trend was significant in both models. This result echoes that of another study conducted in South Africa which found that HIV patients on ARV also consulted traditional healers mainly as many patients tend to believe that traditional healers can help address spiritual concerns arising from the illness (Mall 2005). The tendency of those who die of HIV/TB and cancer to use traditional medicine as first resort may be due to perception of illness, may be HIV/TB and cancer are perceived in a similar way in a social context, since the two are very different in etiology and presentation of symptoms and even in treatment regimens.

Findings also indicate that those who die from respiratory tract diseases (non-TB respiratory tract infections) were less likely to visit a traditional healer first, but were about 2 times more likely to first seek care from hospitals than no treatment. This means that for these patients traditional healing is rarely chosen, instead they opt more for modern hospital services. But this trend was not statistically significant.

Regarding visits to modern medical facilities, our data indicate that adults who die of HIV/AIDS+TB are 3 times more likely ($p<0.01$) than those who died from injuries or other causes (reference category) to visit a hospital first for care than have no-treatment, and the cancer patients were 5 times more likely ($p<0.01$) than the reference category to first consult a hospital rather than go without treatment. This pattern of health service use reveals that those who suffer from cancer and HIV/AIDS+TB are using all forms of treatment both modern hospitals and non-modern facilities like traditional healers and holy water. However, for cancer patients, no-treatment is hardly a choice.

The results indicate that a significant number of those whose cause of death was HIV/AIDS+TB and cancer opt for traditional healers first, even though it's uncertain that traditional healers can cure HIV and /or cancer. Among those who visited traditional healers, 44% were HIV/AIDS+TB patients. This deserves further investigation to better explain the phenomenon. This may be due to the fact that traditional healers are affordable and acceptable based on cultural and traditional values. However, a previous study conducted in Botswana noted that TB patients visited a modern health facility, however, after initiating modern treatment, then went on to visit a traditional or faith healer as well (Steen and Mazonde 1999).

The findings that those who die as a result of HIV/AIDS+TB and cancer use traditional healers is generally consistent with reports of similar studies from other developing countries, which suggest that use of traditional medicine is more frequent for individuals with chronic or terminal illness (Ngalula et al., 2002). In another study in Kwazulu-Natal researchers found that HIV positive patients were using traditional medicine and ART concurrently and some patients were using traditional medicine alone for HIV and HIV-related illness (Peltzer and Mngqundaniso, 2008). Mills et al. (2006) note that in Africa, traditional medicine are at times used as primary treatment for HIV/AIDS and for HIV-related problems including dermatological disorders, nausea, depression, insomnia and weakness. Many people diagnosed as having cancer, for example, tend to change their behaviour and their diets, increase their intake of vitamins, pray more or join self-help group, and consult with alternative or traditional healers in addition to

their biomedical treatment For most inhabitants of developing countries, access to local folk or traditional sources of health care is easier than access to modern health care. On a similar note, scientific opinion should remain receptive to the possibility of herbal treatments being effective in treating particular diseases and conditions; although no traditional medicine has yet been shown, through scientific testing, to be an effective treatment of HIV/AIDS.

The manner in which the type of treatment is chosen suggests that patients expand the range of treatment with a longer duration of illness, and possibly also as their condition deteriorates (Ngalula et al., 2002). However, it is important to note that this study controlled for the length of illness or duration of illness which was measured as number of months that the deceased started to show signs of being ill. Even after controlling for exposure (that is duration of illness), cause of death is the most important determinant of health service use. The finding that type of illness is an important predictor of health service utilization concurs with other studies (Andersen, 1995; Amenu et al., 2000).

Table 7 below shows the recycled predictions of the effect of type of disease or cause of death on health services used before and after running the multivariate model. The technique is used to validate the net effect that cause of death has on use of health services after controlling for the effect of other covariates at the mean value of these variables. This method helps to classify the cause of death by pattern of treatment.

Table 7. Method of recycled predictions, Looking at the effect of cause of death on health care use (before and after running the multivariate model)

UNADJUSTED	**N=**	**No treatment**	**Traditional treatment**	**Hospital/clinic treatment**
Cancer	92	17.4%	27.2%	55.4%
HIV/AIDS + TB	321	26.2%	24.6%	49.2%
Circulatory disease	222	36.9%	14.4%	48.7%
Respiratory disease(non-TB)	39	35.9%	2.6%	61.5%
Injuries+ Other causes	392	51.0%	10.5%	38.5%
ADJUSTED (multinomial logit model)		**No treatment**	**Traditional treatment**	**Hospital/clinic treatment**
Cancer		16.7%	23.5%	59.8%
HIV/AIDS + TB		23.3%	23.0%	53.7%
Circulatory disease		41.4%	15.3%	43.4%
Respiratory disease (non-TB)		41.9%	3.5%	54.6%
Injuries+ other causes		47.2%	12.4%	40.5%

(% in row, do not always add to 100% because of rounding)

In the adjusted predictions we find little difference between individuals suffering from HIV/AIDS+TB and cancer; both go to traditional healers in the same proportion (23% and 23.5% respectively) more often than other categories of illness. The main difference is that those who die of cancer go more often to hospital than HIV/TB deaths, who more often die without treatment (23%).

The pattern of health services use for those who die from circulatory disease is not very different from those who die from injuries and other causes, with a tendency to opt more for hospital as well as having no treatment and less use of traditional healers in both the unadjusted and adjusted predictions. Individuals who die of respiratory diseases are particular in the way they use health-care; when they go for treatment, they hardly go to traditional healers, but go to hospital.

To sum up, HIV/AIDS+TB and cancer patients behave similar in use of health services although those who suffer from cancer go more often to hospital first than no treatment compared to those who die of HIV. A probable reason for use of both hospital and traditional healers may be due to the perception they have of the disease. It may be that HIV/TB and cancer, more so than the other diseases, are perceived as a special threat, causing individuals who suffer from them to seek care from all available health care avenues; including against perceived sorcery or witchcraft through shamanic type of treatment, in the hope of finding a better solution to their health problems. Traditional treatment is often sought for to offer a satisfying and culturally meaningful interpretation of the illness, and when the perceived threat has a strong social connotation and not just a medical interpretation (Frankenberg et al., 1976; Lewis, 1981; Airhenbuwa, 1995).

5 CONCLUSION

The current study is a timely investigation of dominant type of health care in adults who died of HIV/TB in urban Ethiopia. The study reveals that predisposing factors (age, level of education, religion, and ethnicity) are not important predictors of health service utilization for those who eventually died in Addis Ababa. Likewise, the enabling factors (occupation, economic status and availability of amenities in the household: water, telephone and television) were not important factors in predicting choice of treatment. The theory that those with better education and of relatively high economic status are more likely to opt for modern medical services as they are well informed and can digest health information with much easy than those with low or no education is not confirmed by the current study. In the same way, the study also concludes that religion and ethnicity have no effect on choice of treatment, but this is counter to the hypothesis that cultural beliefs (as reflected by religion, ethnicity) and economic status play a role in utilization of health services.

The results show that type of illness, gender and marital status are important determinants of utilization of health services. The results show that males notably went less to traditional healer/holy water, while females had a high likelihood of using traditional medicine. This is in line with previous research and the study concludes that there are gender differences in choice and use of health services (Ahmed et al., 1999).

The results also show that marital status is important in predicting utilization of health services. Chances were higher for those never married to go for treatment (traditional or modern) than for other categories of married or previously married. This is contrary to the hypothesis regarding the protective role of marriage.

There is sufficient statistical evidence to accept the following hypotheses, with some nuances:

- There is a difference in the use of health services between those who died of HIV/TB and those who died from other causes of death. However, patients who died of HIV/TB and cancer behaved almost the same.
- Those who died of HIV/TB were more likely to consult traditional healers. Again, cancer patients did the same.

The results indicate that cause of death or type of illness is the main predictor of type of treatment used or predictor of health care utilization. This means that the dominant type of health care depends more on type of disease than on any other variable. Those who died of HIV/AIDS+TB and cancer had a higher probability of seeking care from traditional healers/holy water, as well as from hospitals. The study reinforces concerns about the use of traditional therapies for such serious type of diseases. However, those who died of cancer had a high possibility of opting for a hospital visit and the chances of no treatment were very low.

This study also point to an interesting finding that adults in Addis Ababa who suffered from non-TB respiratory diseases substantially chose to consult a hospital and hardly sought care from traditional healers.

Literature normally associates traditional medicine with chronic illness, but people who died from diseases of the circulatory system like blood pressure (also a chronic condition) behaved differently and did not resort to traditional medicine as indicated by the results of the study. For that reason, the theory that associates use of traditional medicine with chronic illness is not confirmed in this study.

The important finding is that those who died of HIV/TB and cancer behave similar in terms of how they seek health care (both choose traditional healers in higher proportion, all things being equal). There is need for further investigations to establish why people perceive HIV/TB and cancer as some type of spiritual diseases or as diseases that deserve social care through shamanic practices. Policymakers should be aware of why people perceive their illness differently to enable formulation of policy that is oriented to help people seek proper treatment.

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7 APPENDICES

7.1 APPENDIX I: STATA DO FILE

Do file for statistical analysis using STATA

```
*cd   "C:\Documents and Settings\k0711133\My Documents\VA_PR_3007DATA.dta", clearuse
VA_PR_3007DATA.dta, clear
rename a3 sex
label define sexofdeceased 1 "Male" 2 "Female"
lab values sex sexofdeceased
tab sex
recode a7 (.=3)
label define economicstatus 1 "V.well-off" 2 "well-off" 3 "average" 4 "poor" 5 "very
poor",modify
label values a7 economicstatus
tab a7
recode c12 (4 5 .=3)
label   define   sourceofdrinkingwater   1   "in-house"   2   "in-compound"      3
"othersources",modify
label values c12 sourceofdrinkingwater
tab c12
recode c13c (.=1)
lab def owntv 1"yes" 0 "no"
lab val c13b owntv
tab c13b
recode c13b (.=1)
recode c13c (.=1)
lab def owntelephone 1"yes" 0 "no"
lab val c13c owntelephone
tab c13c
capture drop edulevel
gen edulevel=.
replace edulevel=0 if d4a==0
replace edulevel=1 if d4b==1
replace edulevel=2 if d4b==77
replace edulevel=2 if d4b==2
replace edulevel=3 if d4b==3
replace edulevel=4 if d4b==4
replace edulevel=4 if d4b==5
replace edulevel=5 if d4b==99 | (d4b==. & d4a!=0)
label define education 0 "No education" 1 "Religious" 2 "Primary"  3 "Secondary" 4
"Tertiary" 5 "dont know" , modify
label values edulevel education
tab edulevel
capture drop occupation
gen occupation=.
replace occupation=1 if d5a==1
replace occupation=2 if d5a==2
replace occupation=3 if d5a==3
replace occupation=4 if d5c==1
replace occupation=5 if d5c==2
replace occupation=6 if d5c==3
replace occupation=7 if d5c==9
replace occupation=7 if d5c==. & d5a>3
label define occupation 1 "Students" 2 "Housewife" 3 "Retired"  4 "Self employed" 5
"employer private" 6 "employer state"  7 "dont know", modify
label values occupation occupation
tab occupation

recode d6a ( 4=3) (.=9)
label define deceasedmaritalstatus 1 "never married" 2 "married" 3 "separated" 5
"widowed"  9 "dont know", modify
label values d6a deceasedmaritalstatus
tab d6a
```

```
capture drop age
gen age=real(d1a)
recode age   (12/24=1) (25/34=2)   (35/44=3)   (45/54=4) (55/64=5) (65/74=6) (75/84=7)
(85/125=8) (. 999=9)
lab define age 1 "12-24" 2 "25-34" 3 "35-44" 4 "45-54" 5 "55-64" 6 " 65-74" 7 "75-84"
8 "85+" 9 "missing", modify
lab values age age
lab variable age "10-year age group"
tab age
recode d8 ( 4=3) (.=9)
label define deceasedreligion 1 "orthodox" 2 "muslim" 3 "catholic+protestant" 9 "dont
know", modify
label values d8 deceasedreligion
tab d8
recode d9 (5 7 8 9 10 12 14=99)
label define ethinicity 1 "Amhara" 2 "Oromo" 3 "Gurage" 4 "Tigre"  99 "others", modify
label values d9 ethinicity
tab d9

**Generating exposure(length of illness)
capture drop exposure*
gen exposure_day=cond(e1a_d!=0 & e1a_d!=99,e1a_d/365.25,0) if e1a_d!=99
gen exposure_month=cond(e1a_m!=0 & e1a_m!=99,e1a_m/12,0)  if e1a_m!=99
gen exposure_year=cond(e1a_y!=0 & e1a_y!=99,e1a_y,0) if e1a_y!=99
gen exposure=exposure_day + exposure_month + exposure_year
tab exposure, miss

capture drop month_exp*
gen month_exp=exposure*12
gen month_exp2=month_exp^2
tab month_exp

* Coding of the order of treatment
* For Traditional Healer
tab e5c e4a, missing
* For Holy Water
tab e6b e4a, miss
* Most of those who answer "1, 2, 3" to order did not visit hospital for treatment
* but actually died in hospital/clinic
* => discard these individuals (column "0" in hospital visit) for order analysis
* create a code for order:
capture drop order_trad order_holy
gen order_trad=cond(e4a!=1,0,cond(e5c==.,0,e5c))
gen order_holy=cond(e4a!=1,0,cond(e6b==.,0,e6b))
* Make a count of each category:
capture drop treatment
gen treatment=0
replace treatment=1 if e4a==1 & e5a!=1 & e6a!=1 /* Hospital/clinic only */
replace treatment=2 if e4a!=1 & e5a==1 & e6a!=1 /* Trad Healer only */
replace treatment=3 if e4a!=1 & e5a!=1 & e6a==1 /* Holy water only */
replace treatment=12 if e4a==1 & order_trad==2 & e6a!=1 /* Hosp -> trad healer */
replace treatment=13 if e4a==1 & order_holy==2 & e5a!=1 /* Hosp -> holy water */
replace treatment=21 if e4a==1 & order_trad==1 & e6a!=1 /* trad healer -> Hosp */
replace treatment=23 if e4a!=1 & e5a==1 & e6a==1  /* trad healer + holy water */
replace treatment=31 if e4a==1 & order_holy==1 & e5a!=1 /* holy water -> Hosp */
replace treatment=121 if e4a==1 & order_trad==3 & e6a!=1 /* Hosp -> trad healer ->
Hosp */
replace treatment=123 if e4a==1 & order_trad==2 & order_holy==2 /* Hosp -> trad healer
+ holy water */
replace treatment=131 if e4a==1 & order_holy==3 & e5a!=1 /* Hosp -> holy water -> Hosp
*/
replace treatment=231 if e4a==1 & order_trad==1 & order_holy==1 /* trad healer + holy
water -> Hosp */
tab treatment
```

```
/*
  treatment |      Freq.     Percent        Cum.
------------+-----------------------------------
          0 |        396       37.15       37.15
          1 |        361       33.86       71.01
          2 |          9        0.84       71.86
          3 |         78        7.32       79.17
         12 |          5        0.47       79.64
         13 |         38        3.56       83.21
         21 |         14        1.31       84.52
         23 |         10        0.94       85.46
         31 |         65        6.10       91.56
        121 |          5        0.47       92.03
        123 |          2        0.19       92.21
        131 |         81        7.60       99.81
        231 |          2        0.19      100.00
------------+-----------------------------------
      Total |      1,066      100.00
*/

* grouping of order of treatment to generate first treatment
capture drop vtrad1st
gen vtrad1st=treatment==2 | treatment==21 | treatment==23 | treatment==231
label values vtrad1st YN
lab var vtrad1st "1st visit traditional healer"
tab treatment vtrad1st
capture drop vholyw1st
gen vholyw1st=treatment==3 | treatment==31
label values vholyw1st YN
lab var vholyw1st "1st visit holy water"
tab treatment vholyw1st
capture drop vhosp1st
gen  vhosp1st=treatment==1  |  treatment==12  |  treatment==13  |    treatment==121  |
treatment==123 | treatment==131
label values vhosp1st YN
lab var vhosp1st "1st visit hospital"
tab treatment vhosp1st

* generating order of treatment
capture drop placevisit_2
gen placevisit_2=treatment
recode placevisit_2 (2 21 23 231=1) (1 12 13 121 123 131=2) (3 31=3) (0=0)
label value placevisit_2 plvisit

* group Holy Water + Trad Healer
capture drop placevisit_3
gen placevisit_3=placevisit_2
recode placevisit_3 (0=0) (1 3=1) (2=2)

label define placevisit 0 "no treatment" 1 "1st traditional" 2 "1st hospital", modify
label value placevisit_3 placevisit
tab placevisit_3

/*generating cause of death from stringed variable*/
capture drop icd10_code2
encode icd10_code, generate(icd10_code2)
tabulate icd10_code2, nolabel
capture drop causeofdeath
generate causeofdeath=icd10_code2
recode  causeofdeath  (7/15  20  31/43  95  184  194=1)(104/144  156=2)(145/160=3)(45/76
100=4)(*=0)
label  define  cod  0  "others"  1  "HIV/AIDS+TB"  2  "Circulatory  disease"  3  "respiratory
disease" 4 "Cancers", modify
label value causeofdeath cod
tab icd10_code2 causeofdeath
tab causeofdeath
```

```
table causeofdeath , content(median exposure)
table causeofdeath if causeofdeath!=0, content(median exposure) row

gen causeofdeath_inj=causeofdeath
replace causeofdeath_inj=5 if icd10_code2>=200 & icd10_code2<226
table causeofdeath_inj , content(median exposure freq)
*cross tabulation
tab placevisit_3 causeofdeath, row nofreq chi
tab placevisit_3 sex,row nofreq chi
tab placevisit_3 age, row nofreq chi
tab placevisit_3 edulevel, row nofreq chi
tab placevisit_3 occupation, row nofreq chi
tab placevisit_3 d6a, row nofreq chi
tab placevisit_3 d8, row nofreq chi
tab placevisit_3 d9, row nofreq chi
tab placevisit_3 c12, row nofreq chi
tab placevisit_3 c13b, row nofreq chi
tab placevisit_3 c13c, row nofreq chi
tab placevisit_3 a7, row nofreq chi
tab placevisit_3 month_exp, row nofreq chi(didnt do bivariate too many values)

*Bivariate analysis
char occupation [omit]2
char sex [omit]2
char c13b [omit]1
char c13c [omit]1
char d6a [omit]2
char age [omit] 3
char causeofdeath [omit] 0
char a7 [omit]3
xi: mlogit placevisit_3 i.causeofdeath, rrr baseoutcome(0)
xi: mlogit placevisit_3 i.sex, rrr baseoutcome(0)
xi: mlogit placevisit_3 i.age, rrr baseoutcome(0)
xi: mlogit placevisit_3 i.edulevel, rrr baseoutcome(0)
xi: mlogit placevisit_3 i.occupation, rrr baseoutcome(0)
xi: mlogit placevisit_3 i.d6a, rrr baseoutcome(0)
xi: mlogit placevisit_3 i.d8, rrr baseoutcome(0)
xi: mlogit placevisit_3 i.d9, rrr baseoutcome(0)
xi: mlogit placevisit_3 i.c12, rrr baseoutcome(0)
xi: mlogit placevisit_3 i.c13b, rrr baseoutcome(0)
xi: mlogit placevisit_3 i.c13c, rrr baseoutcome(0)
xi: mlogit placevisit_3 i.a7, rrr baseoutcome(0)
xi: mlogit placevisit_3 month_exp month_exp2, rrr baseoutcome(0)

*Bivariate analysis where traditional treatment is base outcome
xi: mlogit placevisit_3 i.causeofdeath, rrr baseoutcome(1)
xi: mlogit placevisit_3 i.sex, rrr baseoutcome(1)
xi: mlogit placevisit_3 i.age, rrr baseoutcome(1)
xi: mlogit placevisit_3 i.edulevel, rrr baseoutcome(1)
xi: mlogit placevisit_3 i.occupation, rrr baseoutcome(1)
xi: mlogit placevisit_3 i.d6a, rrr baseoutcome(1)
xi: mlogit placevisit_3 i.d8, rrr baseoutcome(1)
xi: mlogit placevisit_3 i.d9, rrr baseoutcome(1)
xi: mlogit placevisit_3 i.c12, rrr baseoutcome(1)
xi: mlogit placevisit_3 i.c13b, rrr baseoutcome(1)
xi: mlogit placevisit_3 i.c13c, rrr baseoutcome(1)
xi: mlogit placevisit_3 i.a7, rrr baseoutcome(1)
xi: mlogit placevisit_3 month_exp month_exp2, rrr baseoutcome(1)

*Multivariate analysis
*Multivariate analysis with bootstrap (for table3, First and second column,
taking no treatment as base outcome)
xi: mlogit placevisit_3 i.causeofdeath i.sex i.age i.edulevel i.occupation i.d6a i.d8
i.d9 i.c12/*
```

```
*/ i.c13b i.c13c i.a7   month_exp month_exp2 , rrr baseoutcome(0) vce(bootstrap,
reps(500) cluster(recno))
*Multivariate analysis with bootstrap (for table3, third column, taking
traditional as base outcome)
xi: mlogit placevisit_3 i.causeofdeath i.sex i.age i.edulevel i.occupation
i.d6a i.d8 i.d9 i.c12 /*
*/ i.c13b i.c13c i.a7 month_exp month_exp2 , rrr baseoutcome(1)
vce(bootstrap, reps(500) cluster(recno))

* To get the results from the recycled prediction, use normal procedure of estimation
(no bootstrap)
xi: mlogit placevisit_3 i.causeofdeath i.sex i.age i.edulevel i.occupation i.d6a i.d8
i.d9  i.c12 /*
*/ i.c13b i.c13c i.a7  month_exp month_exp2 , rrr baseoutcome(0)
recpred  _Icauseofde_1 _Icauseofde_3 _Icauseofde_3 _Icauseofde_4
* ref=others, 1=HIV/TB 2=circul 3=Resp (non-TB) 4=Cancer
```

7.2 APPENDIX II: RESULTS FOR BIVARIATE AND MULTIVARIATE MODELS

No treatment (base outcome)	Frequency	Bivariate	Multivariate
Cause of Death[Injuries+others]	50.5%		
HIV/AIDS + TB	21.2%		
Circulatory disease	20.7%		
Respiratory disease	3.5%		
Cancer	4.0 %		
Gender [female]	43.7%		
Male	56.3%		
Age group [35-44]	13.6%		
12-24	9.3%		
25-34	15.2%		
45-54	12.1%		
55-64	8.3%		
65-74	9.1%		
75-84	7.6%		
85+	11.1%		
Don't know	13.6%		
Education[no education]	34.6%		
Religious	1.5%		
Primary	24.0%		
Secondary	24.0%		
Tertiary	10.6%		
Don't know	5.3%		
Occupation[housewife}	23.2%		
Student	4.8%		
Retired	11.9%		
Self employed	15.9%		
Employer private	22.5%		
Employer state	11.1%		
Don't know	10.6%		
Marital status [married]	40.9%		
Never Married	26.0%		
Separated/divorced	7.6%		
Widowed	23.7%		
Don't know	1.8%		
Religion [Orthodox]	87.1%		
Muslim	9.1%		
Others(Catholics-Protestants)	3.8%		
Don't know	0.0%		
Ethnicity [Amhara]	53.3%		
Oromo	21.0%		
Gurage	10.4%		
Tigre	8.8%		
Others	6.6%		
Source of water [in house]	65.4%		
Piped into compound	17.4%		
Other sources	17.2%		
Household own TV [yes]	83.1%		
No	16.9%		
Household own telephone[yes]	85.4%		
No	14.7%		
Economic status[average]	41.4%		
Very well-off	9.1%		
Well-off	14.4%		
Poor	30.8%		
Very poor	4.3%		

Traditional healer first / no treatment			
Cause of Death [Injuries+others]	23.0%	[Ref]	[Ref]
HIV/AIDS + TB	44.4%	4.6 *** [2.9-7.2]	4.3***[2.3-8.2]
Circulatory disease	18.0%	1.9** [1.1-3.2]	1.5[0.8-2.8]
Respiratory disease	0.6 %	0.3 [0.0-2.7]	0.3[0.0-∞]
Cancer	14.0%	7.6*** [3.7-15.5]	6.7***[2.7-16.5]
Gender [female]	66.9%	[Ref]	[Ref]
Male	33.2%	0.4***[0.3-0.6]	0.4**[0.2-0.8]
Age group [35-44]	18.0%	[Ref]	[Ref]
12-24	7.9%	0.6[0.3-1.4]	0.5[0.1-1.4]
25-34	17.4%	0.9[0.5-1.6]	0.6[0.2-1.4]
45-54	14.0%	0.9[0.5-1.7]	0.8[0.3-1.9]
55-64	8.4%	0.8 [0.4-1.6]	0.8[0.3-2.2]
65-74	11.2%	0.9[0.5-1.9]	1.2[0.4-3.1]
75-84	5.1%	0.5[0.2-1.2]	0.5[0.2-1.8]
85+	6.2%	0.4**[0.2-0.9]	0.6[0.0-30.7]
Don't know	11.8%	0.7[0.3-1.3]	0.6[0.2-1.5]
Education[no education]	34.8%	[Ref]	[Ref]
Religious	1.7%	1.1[0.3-4.6]	1.4[0.0-∞]
Primary	33.2%	1.4[0.9-2.1]	1.4[0.7-2.6]
Secondary	20.8%	0.9[0.5-1.4]	0.7[0.3-1.5]
Tertiary	6.2%	0.6[0.3-1.2]	0.6[0.2-1.8]
Don't know	3.4%	0.6[0.2-1.6]	0.7[0.0 -152.8]
Occupation[housewife}	34.8 %	[Ref]	[Ref]
Student	3.9%	0.5[0.2-1.4]	0.4[0.1-1.6]
Retired	9.0%	0.5[0.3-1.0]	1.4[0.5-3.7]
Self employed	15.7%	0.7[0.4-1.1]	0.8[0.4-1.9]
Employer private	17.4%	0.5**[0.3-0.9]	0.6[0.3-1.4]
Employer state	9.6%	0.6[0.3-1.1]	0.8[0.3-2.1]
Don't know	9.6%	0.6[0.3-1.1]	0.7[0.3-1.9]
Marital status [married]	30.3%	[Ref]	[Ref]
Never Married	30.9%	1.6** [1.0-2.5]	2.8***[1.4-5.8]
Separated/divorced	8.4%	1.5[0.8-3.0]	1.1 [0.4-2.5]
Widowed	29.2%	1.7**[1.0-2.6]	1.2[0.6-2.1]
Don't know	1.1%	0.9[0.2-4.3]	1.8[0.0-∞]
Religion [Orthodox]	93.8%	[Ref]	[Ref]
Muslim	4.5%	0.5[0.2 -1.0]	0.5 [0.2-1.5]
Others	1.7%	0.4[0.1-1.4]	0.4[0.0- ∞]
Don't know	0.0%	0.9[0.]code	2.7[0.0- ∞]
Ethnicity [Amhara]	62.4%	[Ref]	[Ref]
Oromo	20.2%	0.8[0.5-1.3]	0.8[0.5-1.5]
Gurage	7.3%	0.6[0.3-1.2]	0.8[0.3-1.8]
Tigre	5.6%	0.5[0.3-1.1]	0.6[0.2-1.4]
Others	4.5%	0.6[0.3-1.3]	0.6[0.0-66.4]
Source of water [piped to house]	60.1%	[Ref]	[Ref]
Piped into compound	21.4%	1.3[0.8-2.1]	1.2[0.6-2.2]
Other sources	18.5%	1.2[0.7-1.9]	1.0 [0.5-1.9]
Household own TV [yes]	79.8%	[Ref]	[Ref]
No	20.2%	1.2[0.8-2.0]	0.7[0.4-1.5]
Household own telephone[yes]	77.0%	[Ref]	[Ref]
No	23.0%	1.7**[1.1-2.7]	1.9[0.8-4.2]
Economic status[Average]	36.0%	[Ref]	[Ref]
Very well-off	2.8%	0.4**[0.1-0.9]	0.5[0.0-131.2]
Well-off	13.5%	1.1[0.6-1.9]	1.2[0.6-2.4]
Poor	40.5%	1.5**[1.0-2.3]	1.1[0.7-1.9]
Very poor	7.3%	2.0*[0.9-4.3]	1.4[0.4-4.5]
Exposure		1.0***[1.0-1.0]	1.0***[1.0-1.0]
Exposure2		0.9***[0.9-0.9]	0.9[0.9-1.0]

Hospital-Clinic first / no treatment			
Cause of Death [Injuries+others]	30.7%	[Ref]	[Ref]
HIV/AIDS + TB	32.1%	2.5*** [1.8-3.5]	3.1***[2.0-4.8]
Circulatory disease	22.0 %	1.7** [1.2-2.5]	1.3[0.8-2.0]
Respiratory disease	4.9%	2.3** [1.1-4.5]	1.7[0.7-4.0
Cancer	10.4%	4.2*** [2.3-7.7]	5.1***[2.4-11.1]
Gender [female]	49.2%	[Ref]	[Ref]
Male	50.8%	0.8[0.6-1.0]	0.9[0.5 -1.4]
Age group [35-44]	13.0%	[Ref]	[Ref]
12-24	3.9%	0.4**[0.2-0.8]	0.5[0.2-1.4]
25-34	9.8%	0.7[0.4-1.1]	0.5[0.3-1.0]
45-54	10.0%	0.9[0.5-1.5]	0.8[0.4-1.5]
55-64	11.0%	1.4[0.8-2.4]	1.5][0.7-3.1]
65-74	13.8%	1.6[0.9-2.7]	1.8[0.8-3.8]
75-84	11.6%	1.6[0.9-2.8]	1.6[0.7-3.7]
85+	6.7%	0.6[0.4-1.1]	0.8[0.3-2.0]
Don't know	20.3%	1.6*[1.0-2.6]	1.2[0.7-2.3]
Education[no education]	43.7%	[Ref]	[Ref]
Religious	2.4%	1.3[0.5-3.5]	1.3[0.1 -18.4]
Primary	24.4%	0.8[0.6-1.1]	0.9[0.5-1.4]
Secondary	15.9%	0.5***[0.4-0.8]	0.6[0.3-1.1]
Tertiary	6.3%	0.5***[0.3-0.8]	0.6[0.3-1.2]
Don't know	7.3%	1.1[0.6-1.9]	1.2[0.5-2.8]
Occupation[housewife}	29.1%	[Ref]	[Ref]
Student	0.6%	0.1***[0.0-0.4]	0.2[0.0-22801.4]
Retired	15.5%	1.0[0.7-1.6]	1.4[0.7-2.9]
Self employed	15.2%	0.8[0.5-1.2]	1.0[0.5-1.9]
Employer private	18.7%	0.[0.4-1.0]	0.9[0.4-1.7]
Employer state	9.6	0.7[0.4-1.1]	0.9[0.4-2.0]
Don't know	11.4%	0.9[0.5-1.4]	1.2[0.6-2.34
Marital status [married]	40.7%	[Ref]	[Ref]
Never Married	19.9%	0.8[0.5-1.1]	1.7*[1.0-2.9]
Separated/divorced	10.4%	1.4[0.8-2.3]	1.2[0.6-2.3]
Widowed	28.1%	1.2[0.9-1.7]	1.0[0.6-1.6]
Don't know	1.0%	0.6[0.2-1.9]	0.8[0.0-∞]
Religion [Orthodox]	87.4%	[Ref]	[Ref]
Muslim	9.6%	1.0[0.7-1.7]	1.2[0.6-2.4]
Others	2.6%	0.7[0.3-1.5]	0.8[0.3-1.9]
Don't know	0.4%	0.0[n.a.]	0.0[n.a]
Ethnicity [Amhara]	51.2%	[Ref]	[Ref]
Oromo	26.4%	1.3[0.9-1.8[	1.4[0.9-2.1]
Gurage	11.4%	1.1[0.7-1.8]	1.3[0.7-2.4]
Tigre	5.9%	0.7[0.4-1.2]	0.7[0.4-1.4]
Others	5.1%	0.8[0.5-1.4]	0.7[0.3-1.6]
Source of water [piped to house]	62.4%	[Ref]	[Ref]
Piped into compound	17.7 %	1.1[0.7-1.5]	0.9[0.6-1.5]
Other sources	19.9%	1.2[0.9-1.7]	0.9[0.5-1.4]
Household own TV [yes]	80.3%	[Ref]	[Ref]
No	19.7%	1.2[0.9-1.7]	0.9[0.5-1.6]
Household own telephone[yes]	78.9%	[Ref]	[Ref]
No	21.1%	1.6**[1.1-2.2]	1.7*[1.0-3.0]
Economic status[average]	38.8%	[Ref]	[Ref]
Very well-off	4.7%	0.5[0.3-1.0]	0.6[0.3-1.2]
Well-off	13.4%	1.0[0.7-1.5]	1.1[0.6-1.8]
Poor	35.6%	1.2[0.9-1.7]	1.0[0.7-1.5]
Very poor	7.5%	1.9**[1.0-3.4]	1.6[0.8-3.6]
Exposure		1.0***[1.0-1.0]	1.0***[1.0-1.0]
Exposure2		0.9***[0.9-0.9]	0.9*[0.9-1.0]

Hospital-Clinic first /Traditional healer first			
Cause of Death [Injuries+others]	30.7%	[Ref]	[Ref]
HIV/AIDS + TB	32.1%	0.5***[0.4-0.8]	0.7[0.4-1.3]
Circulatory disease	22.0 %	0.9[0.5-1.5]	0.9[0.5-1.7]
Respiratory disease	4.9%	6.5*[0.9-49.6]	5.3[0-∞]
Cancer	10.4%	0.6**[0.3-0.9]	0.8[0.4-1.7]
Gender [female]	49.2%	[Ref]	[Ref]
Male	50.8%	2.1***[1.5-3.0]	2**[1.1-3.6]
Age group [35-44]	13.0%	[Ref]	[Ref]
12-24	3.9%	0.7[0.3-1.5]	1.2[0.4-3.2]
25-34	9.8%	0.8[0.4-1.4]	0.9[0.4-2.1]
45-54	10.0%	1.0[0.5-1.9]	1.0[0.4-2.2]
55-64	11.0%	1.8[0.9-3.7]	1.9[0.8-4.3]
65-74	13.8%	1.7[0.9-3.3]	1.5[0.6-3.9]
75-84	11.6%	3.2***[1.4-7.2]	3.1[0.3-29.3]
85+	6.7%	1.5[0.7-3.4]	1.3[0.4-4.1]
Don't know	20.3%	12.4***[1.3-4.5]	2.1*[0.9-4.7]
Education[no education]	43.7%	[Ref]	[Ref]
Religious	2.4%	1.2[0.3-4.2]	1.0-[0.0-∞]
Primary	24.4%	0.6**[0.4-0.9]	0.6[0.4-1.1]
Secondary	15.9%	0.6**[0.4-1.0]	0.9[0.4-1.9]
Tertiary	6.3%	0.8[0.4-1.7]	0.9[0.3-2.3]
Don't know	7.3%	1.7[0.7-4.3]	1.7[0.5-5.3]
Occupation[housewife}	29.1%	[Ref]	[Ref]
Student	0.6%	0.2**[0.0-0.7]	0.5[0.0-∞]
Retired	15.5%	1.2.1**[1.1-3.8]	1.0[0.4-2.5]
Self employed	15.2%	1.2[0.7-2.0]	1.2[0.5-2.5]
Employer private	18.7%	1.3[0.8-2.1]	1.5[0.7-3.3]
Employer state	9.6	1.2[-0.6-2.2]	1.2[0.5-2.9]
Don't know	11.4%	1.4[0.8-2.7]	1.7[0.6-4.4]
Marital status [married]	40.7%	[Ref]	[Ref]
Never Married	19.9%	0.5***[0.3-0.8]	0.6[0.3-1.2]
Separated/divorced	10.4%	0.9[0.5-1.8]	1.1[0.5-2.4]
Widowed	28.1%	0.7[0.5-1.1]	0.9[0.5-1.6]
Don't know	1.0%	0.7[0.1-3.6]	0.4[n.a]
Religion [Orthodox]	87.4%	[Ref]	[Ref]
Muslim	9.6%	2.3**[1.1-4.9]	2.3[0.3-20.2]
Others	2.6%	1.7[0.5-6.0]	1.9[0.0-∞]
Don't know	0.4%	0.0[n.a.]	0.0[n.a]
Ethnicity [Amhara]	51.2%	[Ref]	[Ref]
Oromo	26.4%	1.6**[1.0-2.4]	1.7*[1.0-2.9]
Gurage	11.4%	1.9**[1.0-3.6]	1.7[0.8-3.9]
Tigre	5.9%	1.3[0.6-2.7]	1.3[0.5-3.3]
Others	5.1%	1.4[0.6-3.1]	1.2[0.4-3.2]
Source of water [piped to house]	62.4%	[Ref]	[Ref]
Piped into compound	17.7 %	0.8[0.5-1.2]	0.8[0.4-1.4]
Other sources	19.9%	1.0[0.7-1.6]	0.9[0.5-1.7]
Household own TV [yes]	80.3%	[Ref]	[Ref]
No	19.7%	1.0[0.6-1.5]	1.3[0.7-2.5]
Household own telephone[yes]	78.9%	[Ref]	[Ref]
No	21.1%	0.9[0.6-1.4]	0.9[0.4-1.9]
Economic status[average]	38.8%	[Ref]	[Ref]
Very well-off	4.7%	1.5[0.6-4.2]	1.1[0.1-23.9]
Well-off	13.4%	0.9[0.5-1.6]	0.9[0.4-1.8]
Poor	35.6%	0.8[0.5-1.2]	0.9[0.6-1.5]
Very poor	7.5%	1.0[0.5-1.9]	1.2[0.4-3.5]
Exposure		1.0[1.0-1.0]	1.0[1.0-1.0]
Exposure2		1.0[1.0-1.0]	1.0[1.0-1.0]]

Key to Appendix II

[ ]	Brackets indicate the reference categories.
n.a.	Not applicable: when the chance are nil (relative risk ratio=0) then the 95% confidence interval cannot be computed.
* ** ***	The two stars indicate that we are working within a 95% confidence interval at a 5% (0.05) level of significance. The numbers in brackets also represent the confidence interval whereby the observed relative risk (of choosing a particular type of health service) is expected to fall somewhere in the range given by the interval. The 5% level of significance implies that there is only a 5% chance that the results obtained are inaccurate and a 95% chance that they are in fact accurate. One star indicates a 10% level of significance and three stars indicate 1% level of significance.